

REMARKS

Claims 1-31 are pending in this application. Claims 18-20 and 25-31 have been subjected to a restriction requirement and have been withdrawn from consideration.

The claims have been amended as indicated above solely in an effort for clarity, and not because of any prior art cited by the Office.

Restriction Requirement

The Office has not responded to Applicant's arguments (filed on June 9, 2003) that the restriction and withdrawal of claims 18-20 and 25-31 from examination was improper. Absent evidence or arguments to the contrary showing that Applicant's arguments were not persuasive, Applicant assumes that the restriction requirement has been withdrawn.

Accordingly, Applicant respectfully requests examination of all pending claims.

Objections To The Drawings

Applicant appreciates the Office's comments about the corrections needed in the drawings. In response, Applicant has amended Figures 1, 3, and 6 as indicated above.

As to Figure 12, "32" and "35" were not both used to designate an implant region. "32" has always been used to designate an implant region and "35" has always been used to designate a body contact region. *See paragraphs 38 and 40 of the original specification.* Paragraph 40 of the specification has been amended to better describe the relation between these two numbers and the components they represent in the Figures.

Accordingly, Applicant requests withdrawal of the Objections to the drawings.

Rejection – 35 U.S.C. § 112

The Office has rejected claims 1-17 and 21-24 under 35 U.S.C. § 112 ¶ 2 for the reasons on pages 3-4. Applicant disagrees with the Office for the following reasons.

1. The Office indicates that there is no antecedent basis for “bottom” and “sidewall” of the trench and the oxide layer. Applicant believes that such language was inherently present in making a trench (and oxide layer or gate oxide in a trench), i.e., when reciting “trench,” it is inherent that the trench contains a bottom and sidewall and those components need not be expressly recited for antecedent basis. Nevertheless, Applicant has amended the claims in an effort to expedite prosecution.
2. The Office indicates that “self-aligned” should always precede “isolation cap”. The first time “isolation cap” is recited in any group of claims, it is preceded by “self-aligned.” In every subsequent reference, only “isolation cap” is recited because it is not necessary to incorporate “self-aligned.” The skilled artisan would have understood the subsequent “isolation cap” to refer back to “self-aligned isolation cap.” Nevertheless, Applicant has amended the claims in an effort to expedite prosecution.
3. The Office argues that substantially is a relative term and renders the claims indefinite. The term “substantially” is used to modify “planar.” In such a context, Applicant submits that “substantially” is not indefinite. Indeed, a search for patents that have both semiconductor and “substantially planar” in the claims resulted in 1081 patents since 1976.
4. The Office argues that polysilicon layer in claim 15 contains insufficient antecedent basis. The antecedent basis for this limitation resides in claim 14 (on which claim 15 depends).

Rejection – 35 U.S.C. § 102(e) over Divakaruni et al.

The Office has rejected claims 6, 12, and 16 under 35 U.S.C. § 102 (e) as being anticipated by Divakaruni et al. (U.S. Published Patent Application No. 2002/014907 A1) for the reasons listed on page 5 of the Office Action. Applicant respectfully traverses this rejection.

The rejected claims are directed to methods for making semiconductor devices by making a trench and then providing an oxide layer on the bottom and sidewall of the trench. Citing paragraph 0007 and Figure 1C, the Office argues that Divakaruni et al. teach such a limitation by providing an oxide layer 18 on the bottom and sidewall of the trench 16. Applicant respectfully disagrees.

Figure 1C depicts an oxide layer 18 that has been formed in trench 16. The oxide layer 18, however, is formed on the sidewalls of trench 16. *See Figure 1C.* In fact, Divakaruni et al. describe in paragraph 0007 that the oxide layer 18 is purposefully formed as a “collar oxide” for the trench. Thus, the Office has not shown where Divakaruni et al. teach that oxide layer 18 is formed on the bottom of the trench 16.

For the above reasons, the Office has not substantiated that Divakaruni et al. anticipate each and every limitation in the rejected claims. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

Rejection – 35 U.S.C. § 102(b) over Baliga

The Office has rejected claims 1, 2, 5, 12, 14, 15, 17, 21, and 24 under 35 U.S.C. § 102 (b) as being anticipated by Baliga (U.S. Patent No. 5,998,833) for the reasons listed on pages 5-6 of the Office Action. Applicant respectfully traverses this rejection.

The rejected claims are directed to methods for making semiconductor devices by making a trench and then providing a oxide layer on the bottom and sidewall of the trench. Citing Figure 4G, the Office argues that Baliga teaches such a limitation by providing a gate oxide layer 28 on a bottom and sidewall of the trench 20. Applicant respectfully disagrees.

Figure 4G depicts an oxide layer 28 that has been formed in an upper portion of trench 20. *See also Figures 4C and 4D.* The oxide layer 28, however, is formed only the sidewalls of trench 20. *See Figure 4G.* In fact, Baliga describe that the oxide layer 28 is “formed on the exposed trench sidewalls 20a and on the polysilicon region 26.” *See column 10, lines 8-9.* Thus, the Office has not shown where Baliga teaches that oxide layer 28 is formed on the bottom of the trench 20.

For the above reasons, the Office has not substantiated that Baliga anticipates each and every limitation in the rejected claims. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

Rejection – 35 U.S.C. § 103 over Baliga

The Office has rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Baliga for the reasons listed on page 6 of the Office Action. Applicant respectfully traverses this rejection.

As detailed above, the Office has not shown where Baliga teaches that oxide layer 28 is formed on the bottom of the trench 20. Nor has the Office argued—much less alleged—that the skilled artisan would have been motivated to modify Baliga to form the oxide layer 28 on the bottom of the trench 20.

Thus, the Office has not substantiated that Baliga teaches or suggests each and every limitation in the rejected claims. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

**Rejection – 35 U.S.C. § 103 over Divakaruni et al. and Baliga (S2460)**

The Office has rejected claim 22 under 35 U.S.C. § 103(a) as being unpatentable over Baliga in combination with Divakaruni et al., for the reasons listed on pages 7-8 of the Office Action. Applicant respectfully traverses this rejection.

As detailed above, the Office has not shown where Baliga teaches that oxide layer 28 is formed on the bottom of the trench 20. Nor has the Office argued—much less alleged—that the skilled artisan would have been motivated to modify Baliga to form the oxide layer 28 on the bottom of the trench 20.

As well, the Office has not shown where Divakaruni et al. teach that oxide layer 18 is formed on the bottom of the trench 16. Nor has the Office argued—much less alleged—that the skilled artisan would have been motivated to modify Divakaruni et al. to form the oxide layer 18 on the bottom of the trench 16.

Thus, the Office has not shown that either cited reference teaches or suggests this claim limitation. Accordingly, the Office cannot show that the combination of references suggests this limitation.

For the above reasons, the Office has not substantiated that the skilled artisan would have considered claim 22 obvious over the combined teachings of Baliga and Divakaruni et al. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Allowable Subject Matter

Applicant appreciates the indication that claims 3, 4, 7-11, and 23 contain allowable subject matter.

CONCLUSION

For the above reasons, as well as those of record, Applicant respectfully requests the Office to withdraw the pending grounds of rejection and allow the pending claims.

If there is any fee due in connection with the filing of this Amendment, including a fee for any extension of time not accounted for above, please charge the fee to our Deposit Account No. 50-0843.

Respectfully Submitted,

By   
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